

Application No. 10/082,000
Attorney Docket No. W1010.136-US-01 (formerly 134.140)

IN THE SPECIFICATION

Please move the heading "SUMMARY OF THE INVENTION" immediately before page 2, line 6 and please substitute the following amended paragraph(s) and/or section(s):

At page 2, line 6 of the original application:

Japanese Patent Application Laid-Open No. 240691/2000 discloses the reduction of the cogging torque and the tertiary harmonic contents in the current wave form by arranging the pole teeth provided on the tip ends of the magnetic poles with windings at the vernier pitch wherein the permeance distribution is balanced by the six order harmonic contents with respect to the three-phase hybrid type stepping motor having six magnetic poles with windings.

At page 10, lines 15 and 16 of the original application:

As a result of the consideration with respect to the structure of the three-phase hybrid type stepping motor, following results can be obtained.

- (1) The magnetic flux in case of the six magnetic poles with windings becomes twice as large as that in case of the twelve magnetic poles with windings, so that the propriety of the multiply of the torque is inspected in this respect.
- (2) In the vernier system, six order balance is the best with respect to the cogging torque and the magnetic flux.
- (3) The tooth width ratio The ratio of the tooth width with respect to the pitch of about 0.4 of the small teeth is the best, however, the tooth width ratio of 0.41 of the normal motor may be adopted with no problem.

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Second amendment to "Summary of the Invention" -- at page 15 of the Amendment and Response to the Office Action dated Oct. 17, 2002:

An object of the present invention is to provide a three-phase hybrid type stepping motor ~~invention~~ comprises comprising a stator, and a rotor arranged concentrically with the stator and with an air gap therebetween, said stator having an annular stator yoke, six stator poles extending radially and formed at a regular pitch on the inner peripheral surface of the annular stator yoke, and stator windings of three-phase each wound around each stator pole, each of said stator poles having a plurality of small stator teeth at the tip end thereof, said rotor having two splitted rotor elements and a permanent magnet held therebetween and magnetized so as to form N and S poles in the axial direction thereof, and a plurality of small rotor teeth formed at a regular pitch on the outer peripheral surface of each of said rotor elements, said two splitted rotor elements being shifted from each other in angular position by a $\frac{1}{2}$ pitch of the small rotor teeth. A permeance distribution of the small stator teeth is a vernier pitch balanced by a six order harmonic wave, and a tooth width ratio of the small rotor teeth with or the small stator teeth with respect to the pitch of the small rotor teeth is set to 0.35 - 0.45.

Another object of the present invention is to provide a three-phase hybrid type stepping motor wherein a permeance distribution of the small stator teeth is a vernier pitch balanced by a three order harmonic wave, and a ratio of tooth width ratio of the small rotor teeth with or the small stator teeth with respect to the pitch of the small rotor teeth is set to 0.35 - 0.45.

A further object of the present invention is to provide a three-phase hybrid type stepping motor, wherein a number of the small rotor teeth is fifty, a number of the small stator teeth is eight, a tooth pitch is 7.05, and a ratio of tooth width ratio of the small rotor teeth with or the small stator teeth with respect to the

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pitch of the small rotor teeth is set to 0.35 – 0.45.